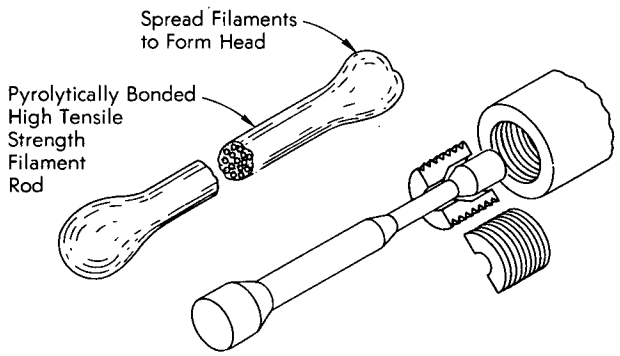
NASA TECH BRIEF

Ames Research Center

Specimen for High-Temperature Tensile Tests

The problem:

To hold a specimen composed of filaments or yarns of refractory material at high temperature and under tension so that its performance may be evaluated.



The solution:

A split nut with an internal taper and a specimen fabricated with a specially formed end to fit within the assembled nut.

How it's done:

The tensile member consists of a bundle of high-strength filaments, such as carbon yarn, which has been impregnated and bonded pyrolytically to form a solid, high-strength part. In composite structures of this type, the temperature limits are set by the strength vs. temperature properties of the filament and the bond. With pure carbon fibers and pyrolytic graphite bonding, the strength of such members should be retained at temperatures as high as 2200°C (4000°F).

As indicated in the diagram, the tension member contains filaments or yarns neatly aligned and closely spaced in the rod-like central portion, but the filaments are spread at the ends before bonding to form the head which will support the member during the test. This technique of forming the ends allows transfer of load from the rod by shear across the filaments rather than shear parallel to the filaments.

The test specimen may be of any cross section (square, round, hollow, irregular, etc.) and of a length determined solely by the available furnaces and testing machines or devices.

The split nut shown in the diagram is formed so that its internal taper matches the taper of the formed head on the tensile specimen. Its external thread is dimensioned to fit the chucks of the testing machine.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Ames Research Center
Moffett Field, California 94035
Reference: B72-10028

Patent status:

No patent action is contemplated by NASA.

Source: C. D. Coulbert of
The Marquardt Company
under contract to
Ames Research Center
(ARC-10531)

Category 04